



# FACT SHEET



BMDO FACT SHEET AQ-00-01

## ***BALLISTIC MISSILE DEFENSE - PROGRAM FOCUS***

### **INTRODUCTION**

"We've seen since the 1991 Gulf War a proliferation of ballistic missile capabilities throughout the world, both through technology and system transfers and indigenous development. Over twenty countries now have ballistic missiles of theater range. Some two dozen countries have, or are capable of developing, weapons of mass destruction. The pairing of these capabilities is a dangerous trend that demonstrates that ballistic missiles are rapidly becoming the weapon of choice among regional powers."

Lt. General Ronald Kadish  
Director, Ballistic Missile Defense Organization  
March 30, 2000

For over fifty years ballistic missiles have been a threat to the United States and its military operations. During the Cold War, the strategic balance and deterrence between Soviet and U.S. forces held this threat to our national security in check. In the absence of a deterrence calculus between superpower rivals, however, national security is again at risk. Deterrence may not work when facing rogue states and terrorists equipped with ballistic missiles. When combined with the spread of weapons of mass destruction (WMD), the threat to American security is compounded. During the Gulf War, SCUD attacks on Coalition forces demonstrated the need to protect our troops overseas. The U.S. government considers the proliferation of longer range ballistic missiles to be one of the greatest dangers to both national security and global security.



### **PROGRAM AREAS**

The Ballistic Missile Defense Organization (BMDO) has three broad program areas: National Missile Defense (NMD), Theater Missile Defense (TMD), and the Ballistic Missile Defense Technology Program. Key programs consist of NMD and five TMD programs: PATRIOT Advanced Capability-3 (PAC-3), Navy Area, Navy Theater Wide, Theater High Altitude Area Defense (THAAD), and Medium Extended Air Defense System (MEADS) systems. The core programs represent the bulk of BMDO's budgeted funding for research, development, test & evaluation (RDT&E) and procurement. The variety of scenarios and threat characteristics (e.g.: maximum/minimum ranges, reentry vehicles, and radar cross sections) and the characteristics of the defended areas (e.g.: military forces, population centers, and ports of debarkation) require complementary systems for complete, cost-effective defense. Additionally, BMDO supports advanced research through its Ballistic Missile Defense Technology to advance and preserve America's technological edge.

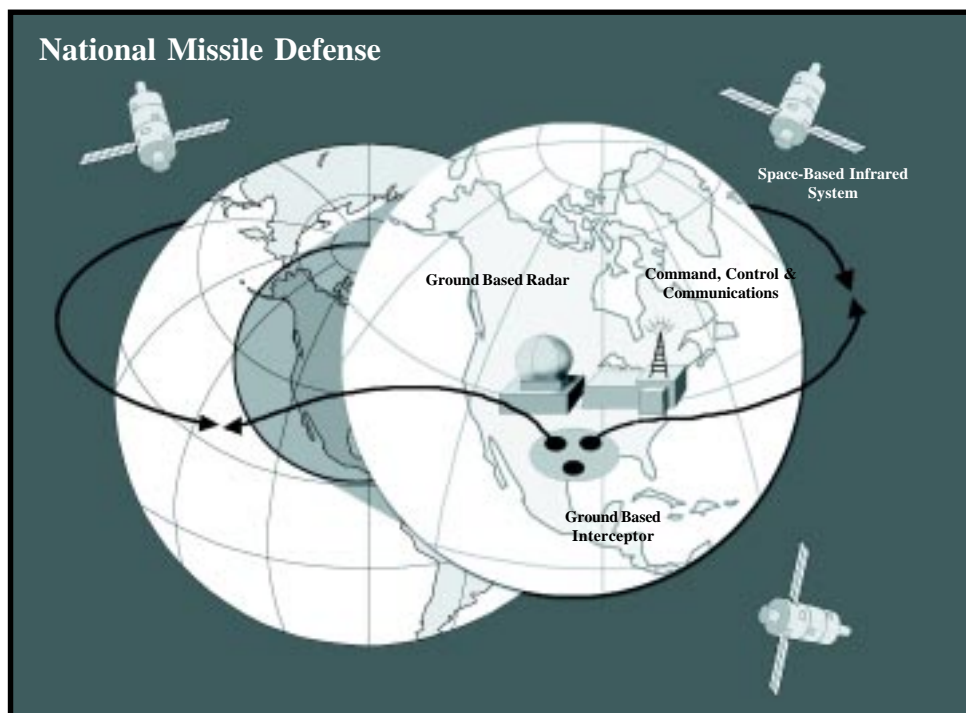
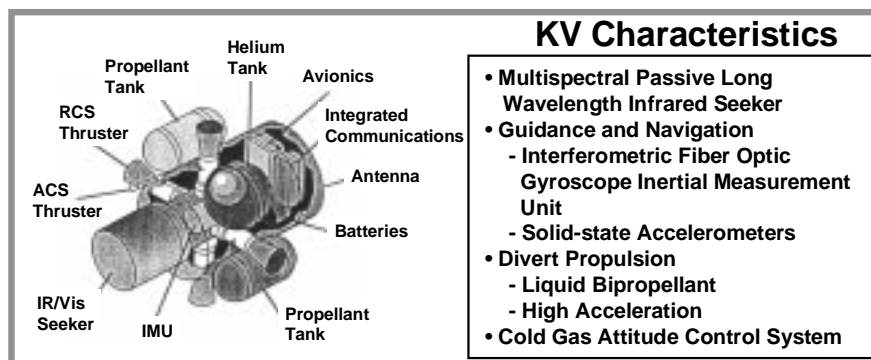
APRIL 2000

The National Missile Defense (NMD) program anticipates the need to field a missile defense system to defeat a limited ballistic missile strike against the US homeland. With the increasing proliferation of both medium- and long-range ballistic missiles and weapons of mass destruction to rogue states and terrorist organizations, it is important to develop a means to defend the American homeland that does not rely on deterrence alone. The decision to proceed to build and deploy a system depends will be made by the President after the

Deployment Readiness Review. The deployment readiness approach incorporates assessments of the threat of attack, the cost of development, our international treaty obligations, and the technological readiness of the system. The NMD program also consists of preparing options for rapid deployment with contemporary technology in case a sudden threat emerges.

Key NMD components include a Ground-Based Interceptor (GBI), featuring the Exoatmospheric Kill Vehicle (KV), an X-Band Radar (XBR), Upgraded Early Warning Radar (UEWR), Battle Management/Command, Control and Communications (BM/C3), and space sensor technology.

The NMD XBR is designed to provide target tracking and discrimination. Currently, NMD program developers are constructing a testbed radar to resolve several technical issues and to participate in the system testing. Upgrades to the current Early Warning Radar network will provide the existing forward-based attack warning system the capability to augment the operation of a NMD system. These radars can be modified quickly and at a cost significantly less than that of building new radars. The BM/C3 project focuses on integrating the NMD interceptor and sensor operations in support of informed decision-making and the best NMD command, control and communications architecture for the system. The GBI program is developing, demonstrating and validating the technology and components for a state-of-the-art and cost-effective hit-to-kill missile to intercept and destroy intercontinental ballistic missiles targeted against the United States. Developing the GBI is the highest priority in the NMD program. This program consists of two efforts, the KV and the booster. The KV efforts are currently concentrating on the technical issues of the interceptor seeker.

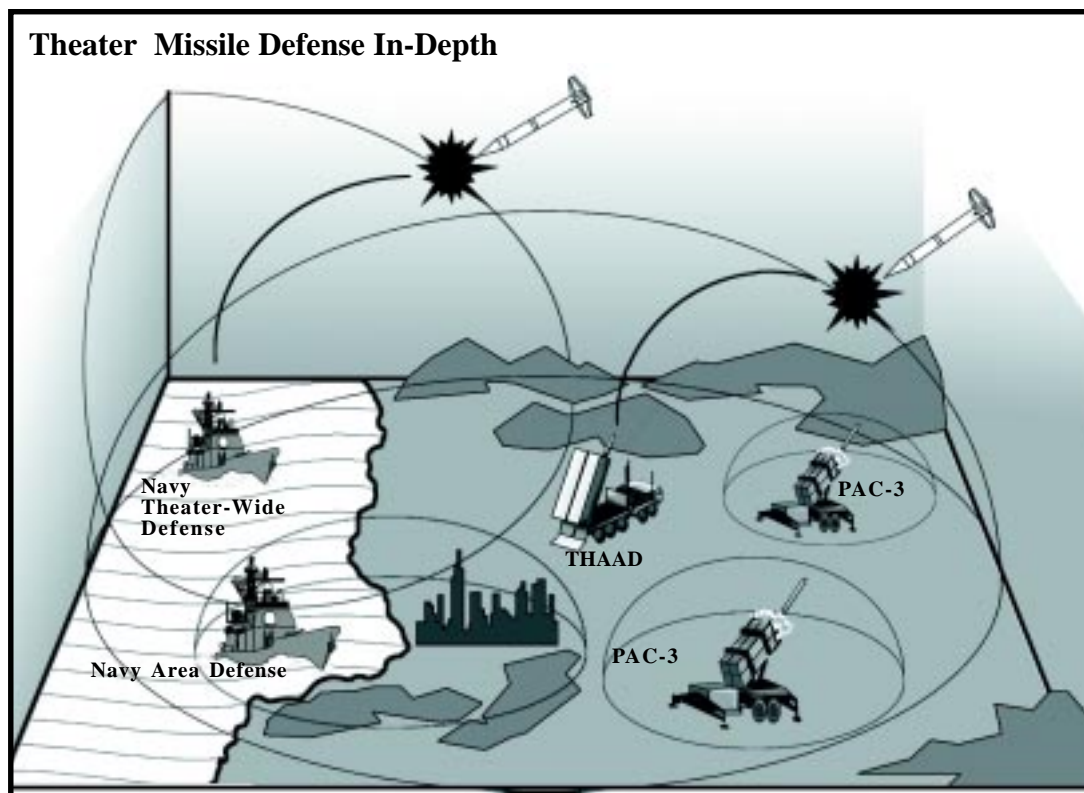


The purpose of Theater Missile Defense (TMD) systems is to protect U.S. forces, allies and other countries, as well as geographical areas of vital interest to the U.S., from theater missile attacks such as population centers, ports of debarkation, and military forces and facilities. TMD concentrates on the more immediate ballistic missile threat posed to U.S. forces. The TMD mission includes protection of population centers, fixed civilian and military assets and mobile military units. BMDO is working to develop both land- and sea-based TMD systems to give our forces the greatest flexibility and provide the most effective protection against short- and medium-range ballistic missiles.

The TMD arena is divided into upper- and lower-tier. The tiers are defined by the altitude at which intercept takes place, the speed of the interceptor and the speed of the enemy missile. TMD systems are built to operate best in one tier, although there may be some crossover capability. This allows the systems to match and negate specific types of missile threats. Moreover, this arrangement gives TMD forces multiple opportunities to destroy incoming missiles as they pass through the tiers.

Lower-tier programs include the Patriot Advanced Capabilities 3 (PAC-3), Navy Area, and Medium Extended Air Defense System (MEADS). Upper-tier programs include the Theater High Altitude Area Defense system (THAAD) and Navy Theater-Wide Defense (NTW). Finally, the Airborne Laser (ABL) program development focuses on destroying the missile shortly after launch. Taken together, these programs provide American and Allied forces with layered defenses capable of engaging incoming theater ballistic missile attacks during all phases of flight. Because it offers more intercept opportunities, and thereby increases the chance for a successful intercept, a strategy of layered defense presents a more comprehensive shield against attack.

THAAD, NTW, Navy Area and PAC-3 are TMD Core programs. THAAD, Navy Area Defense and PAC-3 are Major Defense Acquisition Programs (MDAPs), while NTW is pre-MDAP. MEADS is an international program in the Program Definition-Validation Phase in conjunction with Italy and Germany. Finally, ABL is an Advanced Concept.



## THEATER BALLISTIC MISSILE DEFENSE: PATRIOT ADVANCED CAPABILITY - 3

PATRIOT Advanced Capability - 3 (PAC-3) system development consists of three increasingly sophisticated upgrades called configurations. During 1995 and 1996, the two initial configurations were deployed to provide a missile defense to our troops as quickly as possible. PAC-3 is the most recent version of the famous PATRIOT air defense employed during the 1991 Gulf War. By FY 2001, the first PAC-3 units will be deployed to defend against ballistic missiles inside the atmosphere. This mission includes defending troops and fixed assets from short- and medium-range ballistic missiles, cruise missiles, and other air breathing threats such as fixed or rotary wing aircraft. The PAC-3 Fire Unit has three main components: the ground radar set, the Engagement Control Station, and eight missile launchers. Designed to be deployed anywhere in the world, PAC-3 can be transported aboard C-17 or C-5 aircraft.

### PATRIOT Advanced Capabilities - 3



#### Radar Set

Target detection, tracking and discrimination. Provides up-link communications to in-flight PAC-3 interceptors

#### Engagement Control Station

Provides command, control and communications and fire control for PAC-3. Links PAC-3 to other force elements

**PAC-3 Missile**  
Hit-to-Kill, single stage interceptor destroys targets in endoatmospheric (in the atmosphere) interceptions

**PAC-3 Launcher**  
Protects and launches PAC-3 missiles. Canister provides easy re-loading of up to 16 missiles.

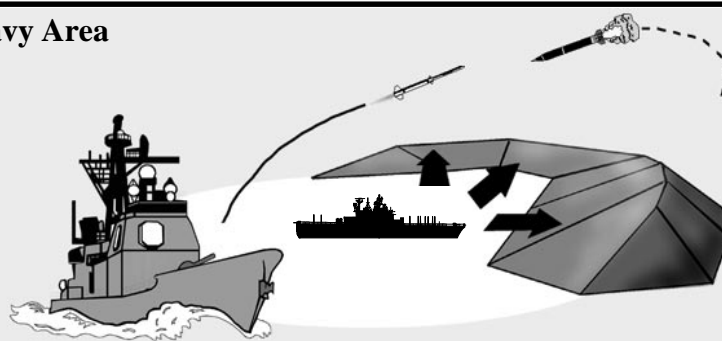
In 2001 PAC-3 Configuration 3 First Units Equipped (FUE) will reach the field. The final PAC-3 Configuration 3 will field improvements to virtually all system components. Upgrades to the ground radar will improve its multifunction and low altitude capabilities, threat detection, and threat discrimination. The new PAC-3 missile will destroy targets by endo-atmospheric hit-to-kill interception - physically ramming the target while it is inside Earth's atmosphere. Other improvements include better command, control, and communications, and greater interoperability.

## THEATER BALLISTIC MISSILE DEFENSE: NAVY AREA

The Navy Area system is based on the Navy's AEGIS cruisers (*Ticonderoga* class) and destroyers (*Arleigh Burke* class), which form the backbone of the U.S. Fleet. With relatively minor modifications, these ships can be adapted to the ballistic missile defense role. The changes include upgrading the ships' AN/SPY-1 radar and AEGIS Combat System computers, as well as the computer programs. The STANDARD Missile (SM-2) Block IV will also be modified to optimize its performance against both cruise and ballistic missiles, including the addition of an infrared seeker to improve intercept accuracy. These improvements will provide theater commanders with a defensive capability against short- and medium-range theater ballistic missiles

(TBMs) in the atmosphere during their descent phase. These ships will not need additional personnel to take on this mission, and the Navy already has the infrastructure in place for training and logistics.

### Navy Area



#### AEGIS Ships:

These ships will provide defense against cruise missiles, aircraft and theater ballistic missiles. They are especially well-suited to protect arriving forces, as well as crucial sea ports, air fields, and other critical assets.

**STANDARD Missile (SM-2) Block IV:**  
Blast-fragmentation warhead, fired from the Vertical Launch System, and guided by the ship's SPY-1 radar system and the missile's infrared sensor.

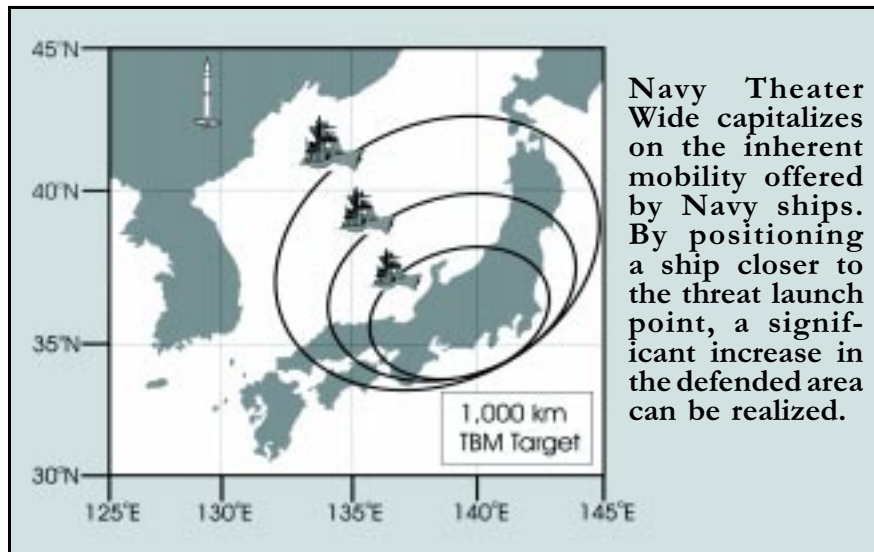
Sea-based TMD offers several advantages to the nation. They can be stationed offshore near potential crisis "hot spots" where land-based TMD forces could not be readily deployed. As ships equipped with the Navy Area system can operate in international waters, there is no requirement to secure approval from a foreign government for deployment of the system. By acting as offshore TMD platforms, ship-based TMD systems can reduce the demands placed on airlift and sealift assets to transport land-based TMD defenses with ground forces. The Navy will receive its First Unit Equipped (FUE) with production software, hardware modifications, and SM-2 Block IVA missiles in 2003.

## THEATER BALLISTIC MISSILE DEFENSE: NAVY THEATER WIDE

Like Navy Area, Navy Theater Wide (NTW) builds on modifications to AEGIS ships and the STANDARD missile. The NTW system will modify the STANDARD missile for ascent, midcourse, and descent phase exo-atmospheric intercepts. The AEGIS Weapon System will be modified to support the increased battle space required for the improved, longer-range interceptor.

In 1996 the Navy Theater Wide (NTW) program became a "core" TBMD program. NTW was also designated a pre-Major Defense Acquisition Program (pre-MDAP).

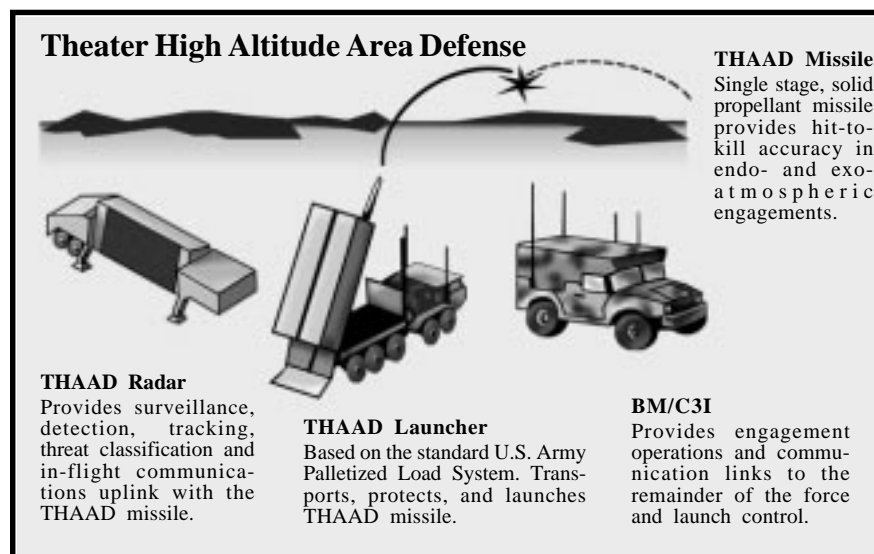
In 2000, NTW conducted additional flights as part of its flight demonstration program. NTW flight demonstration will occur in the AEGIS LEAP Intercept (ALI) phase. The ALI has a series of controlled test vehicles and flight test rounds scheduled from 1997 to 2001. The ALI test series employs the follow-on to the STANDARD Missile 2 (SM-2), known as the STANDARD Missile 3 (SM-3), and will test the four phases of the SM-3's flight: first stage boost, second stage endo/exo-atmospheric midcourse, third stage/KW separation, and guidance, leading to an intercept of TBM targets during various stages of their trajectory. These flight demonstration events will be followed by a series of more stressing threat representative test shots prior to deploying the tactical system.



## THEATER BALLISTIC MISSILE DEFENSE: THEATER HIGH ALTITUDE AREA DEFENSE

Development of the THAAD system started in 1992 and will be fielded by the Army in the 2007 time frame. The Theater High Altitude Area Defense (THAAD) system provides a ground-based, upper-tier component to the TMD architecture. THAAD engages TBMs at higher altitudes and longer ranges than lower tier systems, supporting both exo- and endo-atmospheric hit-to-kill engagements. THAAD's range provides it sufficient battlespace, under most scenarios, to engage a threat, assess the success of the engagement, and, if necessary, fire a second missile.

Comprised of a ground-based, X-band radar, THAAD launcher, THAAD missile (booster and kill vehicle), and battle management/command, control, communications, and intelligence (BM/C3I) segments, THAAD can engage nearly all elements of the TBM threat spectrum. THAAD's ability to intercept incoming TBMs at a distance makes it a key element of the TMD architecture. The ability to do exo-atmospheric intercepts minimizes the effects of warheads of mass destruction on the ground, and prevents post-intercept debris from falling on our troops.





## THEATER BALLISTIC MISSILE DEFENSE: MEDIUM EXTENDED AIR DEFENSE SYSTEM

MEADS, an outgrowth of the U.S. CORPS/SAM program, began as a result of a 1990-92 "Program Cooperative Opportunity Survey." The U.S. Under Secretary of Defense (Acquisition and Technology) (USD(A&T)) invited the French, German, and Italian Governments to cooperate with the United States to develop a medium-range air and missile defense system. Of the three, Germany and Italy continue to work with the United States in a cooperative partnership to develop the system.

MEADS will be a lower-tier component of the Theater Missile Defense active defense pillar that will provide low-to-medium altitude air defense, anti-tactical ballistic missile defense, and cruise missile defense. MEADS units will be lightweight and modular in order to be highly transportable (C-130) and mobile. MEADS units will provide protection for maneuver forces and point defense for critical assets through decisive operations against multiple, simultaneous, 360° attacks by various classes of tactical missiles, Unmanned Aerial Vehicles, and air-breathing threats. Initially, the PAC-3 missile will be utilized as the MEADS interceptor. Eventually, when the threat warrants, a new interceptor will be developed.



All system components will be employed in a distributed architecture using high-capacity tactical communications. Since each battle element/ battery can operate autonomously, one battle element/battery can be moving with the maneuver forces while other batteries are defending vital assets. MEADS will be compatible and interoperable with other Army, Joint Service, and allied systems expected to participate in joint/combined operations.

### BALLISTIC MISSILE DEFENSE TECHNOLOGY PROGRAM

Hit-to-kill technology remains the backbone of Ballistic Missile Defense. It is necessary, however, to continue to hone the technological edge that the United States currently enjoys. To this end, the Ballistic Missile Defense Technology Program supports research on new technologies and provides options for improvement to existing systems. These new ideas include technologies such as the kinetic energy interceptor, advanced surveillance and tracking sensors, and directed energy systems. This program is essential to keep the U.S. ballistic missile defense program ahead of the increasingly sophisticated global missile threat.

### CONCLUSION

The Ballistic Missile Defense Organization (BMDO) continues to work to provide the United States and American armed forces with viable, cost-effective defenses against the threat of ballistic missile attack. By working to develop National Missile Defense and lower and upper tier Theater Missile Defense systems, BMDO's core programs provide an network of interoperable systems capable of engaging ballistic missile threats at multiple stages of flight to increase engagement opportunities and thereby provide the necessary protection.

Ballistic Missile Defense Organization, External Affairs  
7100 Defense Pentagon  
Washington, D.C. 20301-7100  
(703) 695-8743